

Spatial Analysis of Extreme Hydrological Events in Rio de Janeiro - Brazil

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Abstract. The most frequent types of disasters in Brazil are associated with extreme hydrological events. Adding to this situation, in Brazil, there are the extreme sociospatial discrepancies that are historically constructed. Besides, they leave marks in space, making specific areas, for political interest or not, more vulnerable to the different mentioned processes. Anthropogenic action seems to produce an effect on such system and it is also focused on space, producing great changes that may bring significant impacts (often irreparably) on the own mankind and the nature. On the other hand, the urban space and its different dimensions often suffer the pressures of the growing demand and the lack of planning and infrastructure that are typical of developing countries. Nowadays, it appears that the main impacts of climatic and extreme hydrological events are intensified by deficiencies in urban planning, in regional and local scales and, in practice, in the lack of an integrated view of management, creating irreversible damage to downstream. It should be highlighted that, in general, the regional and local scales require approaches that focus on collective interests. To this extent, the public management should plan actions and, also, it may act in a more holistic way adding new trends, such as, the use of geotechnologies that are applied to environmental management in the realm of urban planning. From a case study in the city of Rio de Janeiro, this paper aims to contribute and draw attention to such issues. It may reach its target through pointing and spatially analyzing which areas are in the most critical situation related to the occurrence of extreme hydrological events. Consequently, these specific areas deserve greater attention from the government and from the planning agencies and the urban management. To achieve this goal, it will be proposed a methodology to inventory the occurrence of inundation / flooding for a certain period, in this case 2001-2008. Besides, the methodology may systematize data and integrate them with other important issues that can support the process of identification and analysis of the most critical areas. Historical aspects of occupation and the most vulnerable socio-environmental aspects will be raised, too, in order to validate the highlighted areas. This integration will be enabled concerning the support of geoprocessing techniques. The result of this integration will subsidize the mapping and spatial analysis of the affected areas in the city and the criticality in relation to the extreme hydrological events. Finally, it may be considered that the identification and analysis of these areas can act as fundamental tools to guide the remaining steps of the process of environmental management within the urban context. It should be observed that the identification of the most critical affected areas does not mean the exhaustion of the subject. The location of these areas is directly linked to the sample that was used as basis for analyses. This data set only represents recorded events by the Municipal Civil Defense respecting the studied time frame. However, the results permit to take notes and raise relevant environmental questions about the roots and the occurred impacts that were originated from the extreme hydrological events, which have being observed in recent decades.

Keywords: Extreme Events, Flood Hazards, GIS, Hydric Resources, Spatial Analysis.